DOCUMENT RESUME

ED 197 825 PS 011 954

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TITLE Understanding of Ratioproportionality and Equality Vs. Equity in Children's Sharing.
PUB DATE Apr 81
NOTE 8p.; Paper presented at the Annual Meeting of the Society for Research in Child Development (Boston, MA, April 2-5, 1981).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Age Differences; *Cognitive Ability; Decision Making; Elementary Education; *Elementary School Students; Grade 1; Grade 6; *Individual Differences; *Justice; *Preschool Children; Problem Solving; *Ratios (Mathematics)
IDENTIFIERS *Equity Theory

ABSTRACT

In this study preschool, first grade, and sixth grade children played games which assessed ratio-proportionality ability, thought to be a precursor to proportionality ability, thought to be a precursor to equity allocations. The 48 children (eight boys and eight girls from each grade) played a game with one train which had six cars and one train which had two cars. Children were asked to answer the following question: If each car carried one marble, how many marbles did each train deliver to a pile of 24? (48? 20?). In a second session, another experimenter allowed each child to complete two, connect- the-dot tasks within a time limit and then in the experimenter's absence, to allocate six prizes between himself or herself, an unseen same sex peer who had completed three tasks and a peer who had completed one task. Results indicated that although both ratioproportionality ability and the tendency to allocate in response to equity rather than equality of selfishness increased with age, these abilities were not correlated within age groups. Some children with ratio-proportionality ability adhered strongly to a judgment that allocating equally was most just, while several children without the ability to solve ratio-proportionality problems argued cogently for equity, noting that each person could "get as many as he did." Results are discussed in terms of differences in past and present research. Future research dealing with equity allocations may profit from anonymous allocating opportunities, allocating in a triad, and different allocation tasks and age groups.

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Understanding of Ratioproportionality and Equality Vs. Equity in Children's Sharing

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Paper to be presented at the Annual Meeting of the Society for Research in Child Development, Boston, April, 1980.

PS011954

Abstract

Past researchers have disagreed concerning developmental trends in equity vs. equality allocations. In this study eight boys and girls from preschool, first grade, and sixth grade played a game which assessed ratio-proportionality ability, thought to be a precursor to equity allocations. All 48 children played a game with one train having six cars and one train with two cars. Children were asked to determine: if each car carried one marble, how many marbles did each train deliver to a pile of 24? (48? 20?). In a second session, another experimenter allowed each child to complete two connect-the-dot tasks within a time limit and then in the experimenter's absence the child allocated six prizes between him- or herself, an unseen same sex peer who had completed three tasks and a peer who had completed one task. Results indicated that although both ratioproportionality ability and the tendency to allocate in response to equity rather than equality of selfishness increased with age, these abilities were not correlated within age groups. Some children with ratioproportionality ability adhered strongly to a judgment that allocating equally was most just, while several children without the ability to solve ratioproportionality problems argued cogently for equity, noting that each person could "get as many as he did." Results are discussed in terms of differences in past and present research. Future research dealing with equity allocations may profit from anonymous allocating opportunities, allocating in a triad, and different allocation tasks and age groups.

Understanding of Ratioproportionality

and Equality Vs. Equity in

Children's Sharing

There has been a continuing controversy among equity researchers concerning developmental trends in children's allocation decisions. Some studies have contrasted children's propensity to give equally to all individuals participating in a task or to allocate rewards equitably, in proportion to the work actually done by each individual. Some researchers (e.g., Streater & Chertkoff, 1976) suggest children increasingly prefer equality over equity with age, others (Hook, 1978) argue that a preference for equity over equality develops with age. Streater and Chertkoff, (1976) for example, examined equity allocations by allowing children to divide six "itsy-bitsy" dolls between self and two peers who had completed three, two, or one connect-the-dot pictures. This allocation task gave children who had completed two pictures the opportunity to allocate in various roles in a triad, either with equality (two to each child) or equity (three, two and one doll in proportion to the pictures completed). Thus, children could share simultaneously with someone who had done more work and someone who had done less work than themselves. Streater and Chertkoff noted that the decision to give equally was increasingly preferred with age over the decision to give equitably.

In contrast, Hook explored cognitive precursors to allocation behavior before allowing children to allocate. Children individually played a train game with two trains--one with six cars, one with two cars. Children were asked to determine if each car carried one marble, how many marbles did each train deliver to a pile of 24? Later, they were asked how many marbles each train had contributed to a pile of 48 marbles and 20 marbles. This game allowed the experimenter to

ascertain children's ability to solve the problem either by correctly identifying the exact proportion of marbles contributed by each train, identifying that one train had contributed more than the other (but without identifying the correct proportion), suggesting each train had delivered an equal number, or claiming that the shorter train had delivered more marbles than the long train. After completing this ratioproportionality task, children were allowed to allocate 20 pennies between themselves and one unseen peer who had performed either better than the subject child, equal to, or not so well as the subject. Hook concluded that as children developed, they increasingly allocated with equity rather than equality. He noted that future research was needed to determine the relationship of ratioproportionality ability to allocation. Methodological problems and age range restrictions limit definitive conclusions from these two conflicting studies.

There are two related questions posed by past research. First, which is the more mature strategy--equity or equality allocation--and how does the preference develop? Second, is the ability to solve ratioproportionality problems a necessary precursor to equity allocation? If so, is it a sufficient condition? The present study attempted to provide preliminary information on these two questions.

Method

Eight boys and eight girls from sixth (mean age 11.4 years), first (mean age 6.4), and preschool (mean age 3.4) grades participated as subjects. Four undergraduate women served as Experimenters. First one Experimenter presented Hook's ratioproportionality train task individually to all 48 children. Children played with the six car and two car train and then attempted to note how many marbles in piles of 24, 48, and 20 each train had contributed. Later, a second Experimenter allowed individual children to complete two

connect-the-dot booklets and then noted that she had to leave for a moment. She asked the subject to allocate six "itsy-bitsy" dolls between him or herself, an unseen same sex peer who had completed three booklets, and a peer who had completed one booklet. The subject and both peers had a brown paper sack with their name on it and in front of each sack was the number of booklets completed. Thus, the subject was visually reminded of how many booklets each child had completed. After the child had divided the 6 dolls into the sacks, he or she was asked to close up the sacks and put them in a big box. The experimenter then left the room. The allocation allowed equity, equality, or selfish allocations and was made in a way to guarantee anonymity.

Finally, the second Experimenter returned and noted that she needed to find one extra itsy-bitsy among the sacks. The subject was then casually asked about his or her allocation strategy. A probe for intersubject communication was also given at this time and revealed no evidence of intersubject communication.

Results

The results indicated that with age children were increasingly able to solve the ratioproportionality problems correctly on the first two train tasks [F (2, 42) = 9.42, $p < .01$; F (2, 42) = 5.39, $p < .05$] but no such relationship existed for the more difficult third task [F (2, 42) = 1.82, $p < .17$], as even sixth graders failed to solve this problem correctly. Children were also more likely to perform an equity allocation with age, with 31% of the preschool children and 75% of first and sixth grade children allocating in the 3 for the peer who had completed three booklets--2 for self--and 1 for the peer who had completed one booklet, equity pattern. However, it is interesting to note that there was no relationship between the strategy used to solve the train task and to allocate itsy-bitsies at any age ($-.15 \leq r \leq .19$). Indeed,

several children demonstrated excellent ability to solve the ratioproportionality tasks but explained during debriefing that it was "fairer" to apportion rewards equally. Other children failed to understand the mechanics of the easiest ratioproportionality problem and probably would have been unable to allocate dolls equitably if that task had been more complex. These children did, however, have a firm sense of the justice of insuring that each person "get as many as he did."

Thus, it would appear that, at least in these subjects, ratioproportionality ability developed parallel to the tendency to make equity allocations, but was not a necessary cognitive precursor to the belief in the justice of allocating equitably, as Hook had suggested. However, equity was found to increase with age in line with Hook's, and contrary to Streater and Chertkoff's suggestions. Equity was also noted in one third of the preschool children. Since the sharing task in this study was identical to the one used by Streater and Chertkoff, who reported that equality, not equity increased with age, this finding is surprising. The primary difference between the two studies was that in the present study children allocated in private, while in the Streater and Chertkoff study children allocated in the presence of an experimenter who pointed out the equivalence of the six toy rewards and the six booklets completed. At least the latter instructions would seem to provide a demand characteristic for equity, not for the equality allocation pattern Streater and Chertkoff found. The difference in results may be a function of children observing that the experimenter understood that there had been six booklets completed and six rewards to be given out. Older children may have felt that since the experimenter claimed not to know how to apportion rewards in the Streater and Chertkoff study, the obvious equity solution was not the correct one. Alternatively, equality may be viewed as a socially more acceptable but less

just solution and thus equality was prefered when donating in front of the experimenter in the Streater and Chertkoff study, but equity was prefered when donating in private in the present study. Future research on equity with children should extend the present findings with similar methodology and with a variety of allocation tasks and age groups.

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